him," and also to remove from the mind of the reader the unpleasant feeling he has all along had whilst perusing the papers, that he was a party to a mean action in so doing.

The earliest essay, in an unfinished form, written whilst *in statu pupillari*, is entitled "Some Remarks of a Girtham girl on Female Education," and combats those "male sycophants" who "would prevent us from competing with you; you would separate yourselves on your island of knowledge, and sink the punt which would bear us over to your privileged shore. Of all the twaddle—forgive me, male sycophants!—that the world has ever heard, I think the greatest is that which you have talked about female education."

The second paper is a "Lecture on the Theory of Brain-Waves, and the Transmigration and Potentiality of Mental Forces." She takes the usual equation

$$y = \frac{a}{r} \sin \frac{2\pi}{\lambda} (vt - r),$$

and determines λ by the method of mesmerism. "We find the ratio of brain to brain—the relative strength which one bears to another; and then, by an application of our formula, we can actually determine the wave of thought, and read the minds of our fellow-creatures. An unbounded field for reflection and speculation is here suggested. Like all great discoveries, the elements of the problem have unconsciously been utilized by many who are unable to account for their method of procedure. . . . The development of this theory of brain-waves may be of great practical utility to the world. It shows that great care ought to be exercised in the domain of thought, as well as that of speech." Some verses follow, and then we have Papers iii. and iv., which are, in our opinion, the best part of the book, viz. a "Lecture on the Social Properties of a Conic Section," and the "Theory of Polemical Mathematics." Paper v. contains a "Lecture upon Social Forces, with some Account of Polemical Kinematics," and Paper vi. carries on the preceding into "Polemical Statics and Dynamics"; Paper vii. expounds the "Laws of Political Motion," and Paper viii. closes the book with a lecture "On the Principle of Polemical Cohesion." We ought to apologize for going into such detail, but our account will show our readers that the present work does not deal with mathematical discoveries. It is a "skit," with the perusal of which a reader acquainted with mathematics may while away, not unpleasantly, an odd half-hour or two.

Antipodean Notes. By "Wanderer." (London: Sampson Low, 1888.)

Lights and Shadows of Melbourne Life. By John Freeman. (Same publishers.)

THE "notes" in the first of these two books do not embody the results of a very wide experience. They simply record some observations made by the author in the course of a nine months' tour round the world. "Wanderer" does not, however, pretend to offer an exhaustive account of any of the subjects on which he touches. He has an easy, pleasant style, and gives with some vividness his first impressions of the scenes he describes. The greater part of the book relates to New Zealand, the practical, commercial, and social aspects of which he had, he thinks, more and better opportunities of studying than are obtainable by the majority of "globe-trotters." There is a short but interesting chapter on the Maoris, of whose qualities, as they have been affected by contact with civilization, "Wanderer" has no very exalted opinion. He admits, however, that there are exceptions to what he calls "the average of uselessness." One of the native members of the House of Representatives is, he says, "highly educated, intelligent, and even eloquent." The question whether women should be admitted to the House was lately discussed, and the speech of this deputy on the subject was "by far the most brilliant and entertaining of a debate in which many colonial legislators soared above the ordinary level of dull mediocrity."

The second book consists of a series of papers, some of which were originally contributed to Melbourne newspapers. They are written in rather too "smart" a style, but contain much information which it would be hard for Englishmen who may be interested in Melbourne to find elsewhere. The book will no doubt be welcomed by many visitors who will go this year to Melbourne to see the Centennial International Exhibition.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Salt Industry in the United States.

I CAN sympathize to a great extent with your correspondent George P. Merrill on the question of salt statistics. For a number of years I have been accumulating information on the whole subject of salt, and have found the greatest difficulty in obtaining much of a trustworthy character. The most extensive salt literature is in Germany: even there the statistical part of the subject is not dealt with so extensively as the geological, geographical, chemical, and manufacturing. Perhaps the most complete salt literature is that of India, which is issued yearly by the Government; but it deals almost exclusively with Indian salt.

I am not much surprised that the information in our Encyclopædias respecting the salt industry of the United States should be so scanty. Most of the information derivable respecting it has to be obtained from public newspapers, trade pamphlets, or papers in scientific journals. It is true that, so far as the deposit of Petit Anse, in Louisiana, is concerned, the United States Government published an account of it shortly after the termination of the great war. Dr. Sterry Hunt, whom I had the pleasure of meeting at Manchester at the British Association, has written probably more than anyone else on American salts; but it must be borne in mind that it is only within the last twenty years that the great salt discoveries in Western New York and Michigan have been made. I have a complete or nearly complete list of all the Michigan works, which was issued in the *Chicago Tribune* of January 24, 1888. I have also before me a copy of the *Saginaw Courier* of December 18, 1887. This gives some valuable tables respecting the Michigan salt. In Michigan, in 1887, 3,944,309 barrels of salt were inspected by the salt inspector. In 1869, only 561,288 barrels were made; and in 1880, 2,676,588. There was more salt made in Michigan in 1887 than had been made previously to 1869 in that State. The growth of the salt manufacture has been exceedingly rapid in the States; hence the reason why so little is known of it outside the persons interested in the trade.

Within the last five or six years there has grown up a most extensive salt manufacture in the Wyoming Valley in Western New York. Already this new district bids fair to cut out entirely the old Syracuse or Onondaga district. The make of American salt has much more than doubled itself in the last ten years. I am sure that personally I shall be much pleased if Mr. Merrill will, either through your columns or direct to me, give any information more accurate than is obtainable from our Encyclopædias. I am striving to establish at Northwich, the centre of the Cheshire salt trade, a Salt Museum, and although I have been for a long time accumulating specimens of salt from all parts, and have, thanks to the East Indian Government, and through the kind exertions of Mr. J. T. Brunner, M.P., our Parliamentary representative, who is most handsomely furnishing the Museum, a complete set of specimens of Indian salt, yet I find great difficulty in obtaining works treating on salt, also maps, plans, and diagrams. I trust, by degrees, to have a Museum perfectly unique, I believe.

When I say that until the last two or three years our English salt statistics have not been trustworthy, and that it is only by the indefatigable exertions of Mr. Joseph Dickinson, H.M. Inspector of Mines, assisted by myself and one or two other gentlemen connected with our salt trade, that they are now very nearly complete, Mr. Merrill must not be surprised at the difficulty of getting

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trustworthy information. For some seventeen years I have kept a complete list of all salt exports from the Mersey ports, and this list, I think, is the only complete one published, though the Salt Chamber of Commerce here professes to have a list, which it does not issue for public use. Indeed, I regret to say that it is almost impossible to get any assistance or information from this body.

The French Government issues at times a list of salt manufactured or raised from mines. The last I received, viz. 1879, gave, as the production for that year, 283,000 tons of sea salt and 293,000 tons of rock salt.

I shall be glad to give any information I possess to Mr. Merrill, and should be glad if any of your readers could give any information or assistance that would enable me to make as complete as possible the Salt Museum we are here forming.

Northwich, Cheshire. THOMAS WARD.

Prof. Rosenbusch's Work on Petrology.

PROF. BONNEY'S letter (NATURE, vol. xxxvii. p. 556) makes me venture once more to ask permission for space for a few remarks. One of the objects I had in view in writing to you at first is partly attained by the appearance of Prof. Bonney's "friendly protest"; and his remark that but for my letter he should have refrained "for a season" leads me to hope that in due course this object may be still further realized.

Prof. Bonney sees great objections to Rosenbusch's system of classification, and demurs to some of his groups altogether, both as to those admitted and those omitted. Naturally, then, he desires that this system shall not, by students of petrology, be too readily accepted nor too blindly followed. I do not think there is much danger of this, nor do I think that the "viaduct" was too much complimented either by Dr. Hatch or myself, the defective foundation of the piers in question being quite sufficiently alluded to for the time being.

The position, however, seems to be this. The number of earnest students of petrology is larger now than formerly, and is on the increase. They feel that no satisfactory system of classification had yet been offered to them, and indeed are rather bewildered by the fact that opinions as to what is the best system have been almost as many in number as the teachers who could by any means claim to be authorities entitled to instruct in this matter. Also, it is now a long time since any detailed system of classification, covering the whole ground, has been attempted.

Now we have such an attempt offered to us by Rosenbusch, and there is no doubt that to many it will be very welcome and will be largely used, in spite of the defects undoubtedly seen in it.

Prof. Bonney objects to the viaduct because of the weakness of some of its piers, and still more strongly objects to it, I think, because he considers that when a student has crossed it he will arrive at a point from which he will obtain a view of the surrounding country which will not be a good or correct view, and which will in some respects confuse the knowledge of that country already obtained and still to be sought for.

Would not this be just exactly the best time for some authority of great experience to come forward and point out to us younger workers wherein the viaduct is defective, and wherein we shall see wrongly from the ground on the further side of it; and to tell us his opinions as to a better viaduct, so placed as to lead us to a better point of outlook?

May we hope that Prof. Bonney will himself give us such a detailed criticism of the subject? It would be received with great attention and gratitude by many who, like myself, are looking for "light and leading" in this branch of study.

A. B.

History of the Contraction Theory of Mountain Formation.

IN his "Physical Geology," second edition, p. 674, Prof. Green says: "The notion that the earth's contraction has been the cause of the displacement of the rocks and the elevations of the surface seems to have occurred first to Descartes (éd. française, 1668, p. 322)."

It does not seem to be generally known that, a few years later, the same idea occurred to Newton. In a letter to Dr. Thomas Burnet he refers to that writer's "Sacred Theory of the Earth," the Latin edition of which was published in 1681, and considers the creation of the earth in connection with the Mosaic account. After suggesting illustrations of the "generation of hills," Newton concludes thus: "I forbear to describe other causes of mountains, as the breaking out of vapours from below before the earth was well hardened,—*the settling and shrinking of the whole globe after the upper regions or surface began to be hard;*" though he adds, "I have not set down anything I have well considered, or will undertake to defend."

The letter, which is written in reply to one of Burnet's, dated January 13, 1680-81, is given in full in Brewster's "Memoirs of Sir Isaac Newton," vol. ii. Appendix 4. The manuscript from which it is printed is a copy of the letter, without date or signature; but, according to Brewster, "the whole is distinctly written in Sir Isaac's hand." CHARLES DAVISON.

Birmingham, April 23.

Lightning and Milk.

EMIN PASHA (NATURE, vol. xxxvii. p. 583) mentions the African superstition "that fire kindled by a flash of lightning cannot be extinguished until a small quantity of milk has been poured over it." This idea is embodied in a Russian proverb, and has also existed in parts of Germany (Boyes, *Lacon*, p. 157). Emin Pasha adds that, in tempering swords made from meteoric iron (*vulgo*, thunderbolts), the blacksmith uses not water, but milk. Are other instances of this custom known? Has any explanation been offered? Indian folk-lore furnishes two ideas which may illustrate it: one, that the fall of a meteor is a bad omen (*Indian Notes and Queries*, July 1887, 674); the other, that evil spirits are very fond of fresh milk (*ib.*, December 1886, 198). Meteorites and lightning are connected in the minds of ignorant people, particularly, as Emin Pasha tells us, in the present instance. The milk, therefore, whether applied by smith or fire-man, may be rather intended as a propitiation than used for its intrinsic power of tempering steel or extinguishing flame. F. A. BATHER.

20 Campden Hill Road, Kensington, W., April 29.

The Duplex Pendulum Seismograph.

As the accuracy of the duplex pendulum seismograph has been impugned by a writer in NATURE, vol. xxxvii. p. 571, who at the same time adopts the instrument (with modifications which are, in my opinion, the reverse of improvements) I forward to you comparison diagrams. They show side by side the record given by the seismograph itself, and the real motion of the base of the instrument when that was artificially shaken in a manner that closely imitated an earthquake. The real motion was recorded by means of a multiplying lever hinged by a universal joint in a bracket fixed to a separate support. In both records the motion is magnified about six times. The agreement of the two demonstrates the accuracy of the instrument as an earthquake recorder, alike for large and for small motions. These are examples of tests which I have been in the habit of applying to seismographs since 1880 (see Proc. R. S., vol. xxxi. p. 440). In the present case the test was made with one of the duplex pendulum seismographs made and sold by the Cambridge Scientific Instrument Company, and described by me in NATURE, vol. xxxiv. p. 343. J. A. EWING.

University College, Dundee, April 20.

Self-Induction.

I HAVE to apologize for erroneously attributing to Dr. Lodge a suggestion with reference to the self-induction of wires for high-tension electric discharges. I do not, however, consider, as Prof. Lodge appears to do, that for such discharges it is "on the face of it absurd" to suppose that the self-induction of iron wires is less than that of copper wires of the same dimensions. Prof. Ewing has suggested that for very small values of the magnetizing force, H, iron may possibly behave as a diamagnetic body, and the corresponding values of the magnetic susceptibility, k, may be negative. The values of the magnetic induction, B, which are given by the equation—

$$B = (1 + 4\pi k)H,$$

will be less than H, because k is negative. The rate of increase of B with H will be less than unity for iron if this supposition is true, and will be equal to unity for copper, for which we may suppose that the value of k is negligible. The coefficient of self-induction, which will be proportional to the rate of increase of B with regard to H for wires of the same dimensions will accordingly be less for the iron than for the copper.

City and Guilds Institute, May 2. W. E. SUMPNER.

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